IN THE CLAIMS

Claims 1-5 (CANCELLED)

Claim 6 (CURRENTLY AMENDED): Apparatus for heart pacing with hemodynamic improvement, comprising:

one or more electrodes, which are adapted to convey electrical signals to respective cardiac muscle segments; and

signal generation circuitry, which applies an extended pacing signal, having an overall duration greater than 8 ms, to the one or more electrodes so as to pace the heart,

~~Apparatus according to claim 1,~~

wherein the signal has a leading edge and a trailing edge, and wherein the trailing edge is characterized by an absolute rate of voltage change substantially smaller than that of the leading edge.

Claim 7 (ORIGINAL): Apparatus according to claim 6, wherein the absolute rate of the voltage change is less than a minimum rate of change necessary to generate an action potential in the cardiac muscle segments.

Claims 8-9 (CANCELLED)

Claim 10 (CURRENTLY AMENDED): Apparatus for human heart pacing with hemodynamic improvement, comprising:

one or more electrodes, which are adapted to convey electrical signals to respective cardiac muscle segments; and

signal generation circuitry, which is adapted to apply an extended pacing signal to the one or more electrodes so as to pace the human heart, the extended pacing signal having an overall duration greater than 8 ms from a time of initiation of application of that portion of the signal that initiates action potential propagation,

~~Apparatus according to claim 1,~~

wherein the extended pacing signal comprises a train of pulses, and

wherein the signal has an amplitude that is not sufficient for cardioversion.

Claim 11 (ORIGINAL): Apparatus according to Claim 10, wherein each of the pulses in the train has a pulse duration of at least 1 ms.

Claim 12 (ORIGINAL): Apparatus according to Claim 10, wherein the pulse train has a period of at least 5 ms.

Claim 13 (ORIGINAL): Apparatus according to claim 12, wherein the pulse train has a period of at least 20 ms.

Claim 14 (ORIGINAL): Apparatus according to Claim 10 wherein the train of pulses comprises a plurality of biphasic pulses.

Claim 15 (ORIGINAL): Apparatus according to Claim 10, wherein the train of pulses has a duty cycle between about 10% and 50%.

Claims 16-54 (CANCELLED)

Claim 55 (CURRENTLY AMENDED): A method for heart pacing with enhancement of cardiac contraction, comprising:

applying one or more electrodes to a subject's heart; and

conveying an extended pacing signal, having an overall duration greater than 8 ms, to the one or more electrodes so as to pace the heart,

~~A method according to claim 50,~~

wherein the signal has a leading edge and a trailing edge, and wherein the trailing edge is characterized by an absolute rate of voltage change substantially smaller than that of the leading edge.

Claim 56 (PREVIOUSLY PRESENTED): A method according to Claim 55, wherein the absolute rate of the voltage change is less than a minimum rate of change necessary to generate an action potential in the cardiac muscle segments.

Claims 57-58 (CANCELLED)

Claim 59 (CURRENTLY AMENDED): A method for heart pacing with enhancement of cardiac contraction, comprising:

applying one or more electrodes to a human subject's heart; and

conveying an extended pacing signal to the one or more electrodes so as to pace the heart, the extended pacing signal having an overall duration greater than 8 ms from a time of initiation of application of that portion of the signal that initiates action potential propagation,

~~A method according to claim 50,~~

wherein conveying the extended pacing signal comprises conveying a train of pulses, and

wherein the signal has an amplitude that is not sufficient for cardioversion.

Claim 60 (PREVIOUSLY PRESENTED): A method according to Claim 59, wherein each of the pulses in the train has a pulse duration of at least 1 ms.

Claim 61 (PREVIOUSLY PRESENTED): A method according to Claim 59, wherein the train of pulses has a period of at least 5 ms.

Claim 62 (PREVIOUSLY PRESENTED): A method according to Claim 61, wherein the train of pulses has a period of at least 20 ms.

Claim 63 (PREVIOUSLY PRESENTED): A method according to Claim 59, wherein conveying the train of pulses comprises conveying a plurality of biphasic pulses.

Claim 64 (PREVIOUSLY PRESENTED): A method according to Claim 59, wherein the train of pulses has a duty cycle between about 10% and 50%.

Claims 65-150 (CANCELLED)

Claim 151 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein conveying the extended pacing signal comprises modifying a characteristic of pulsatile flow of blood in the heart.

Claim 152 (CURRENTLY AMENDED): A method according to Claim 151, wherein modifying the characteristic comprises increasing a stroke volume of the heart by at least 5% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

Claim 153 (PREVIOUSLY PRESENTED): A method according to Claim 152, wherein increasing the stroke volume comprises increasing the stroke volume by at least 10% relative to the stroke volume when the heart is paced with pulses less than 2 ms in duration.

Claim 154 (PREVIOUSLY PRESENTED): A method according to Claim 151, wherein modifying the characteristic comprises modifying a cardiac output of the heart by at least 5% relative to the cardiac output when the heart is paced with pulses less than 2 ms in duration at a pacing rate equal to that of the extended pacing signal.

Claim 155 (PREVIOUSLY PRESENTED): A method according to Claim 151, wherein modifying the characteristic comprises increasing a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

Claim 156 (PREVIOUSLY PRESENTED): A method according to Claim 151, wherein modifying the characteristic comprises decreasing a contractility of at least a portion of the heart by at least 10% relative to the contractility thereof when the heart is paced with pulses less than 2 ms in duration.

Claim 157 (PREVIOUSLY PRESENTED): A method according to Claim 151, wherein modifying the characteristic comprises modifying a muscular tension in the heart by at least 10% relative to the tension when the heart is paced with pulses less than 2 ms in duration.

Claim 158 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein conveying the extended pacing signal comprises modifying the duration of an action potential in the respective cardiac muscle segments by at least 10% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

Claim 159 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein conveying the extended pacing signal increases a muscular tension in the respective cardiac muscle segments by at least 50% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

Claim 160 (PREVIOUSLY PRESENTED): A method according to Claim 159, wherein conveying the extended pacing signal increases the muscular tension in the respective cardiac muscle segments by at least 100% relative to the duration when the heart is paced with pulses less than 2 ms in duration.

Claim 161 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein applying the one or more electrodes comprises applying a plurality of electrodes in different chambers of the heart.

Claim 162 (PREVIOUSLY PRESENTED): A method according to Claim 161, wherein conveying the extended pacing signal comprises conveying a plurality of waveforms respectively to the electrodes in the different chambers according to a predetermined time sequence.

Claim 163 (PREVIOUSLY PRESENTED): A method according to Claim 161, and comprising conveying a pacing pulse having a duration less than 8 ms to one or more of the electrodes positioned in a first one of the different chambers, and wherein conveying the extended pacing signal comprises conveying the signal to another one or more of the electrodes positioned in a second one of the different chambers.

Claim 164 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein conveying the extended pacing signal comprises conveying the signal to the one or more electrodes in response to a demand for an enhancement of hemodynamic performance of the heart.

Claim 165 (PREVIOUSLY PRESENTED): A method according to Claim 164, wherein the enhancement of hemodynamic performance comprises an increase in cardiac output.

Claim 166 (PREVIOUSLY PRESENTED): A method according to Claim 164, and comprising receiving an output signal responsive to a physiological parameter indicative of the demand for the enhancement, and wherein conveying the extended pacing signal comprises conveying the pacing signal responsive to the output signal.

Claim 167 (PREVIOUSLY PRESENTED): A method according to Claim 164, and comprising, in the absence of the demand for the enhancement, conveying pacing pulses to the electrodes of substantially lower energy than the extended pacing signal.

Claim 168 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein applying the one or more electrodes comprises applying electrodes endocardially.

Claim 169 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein applying the one or more electrodes comprises applying electrodes epicardially.

Claim 170 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein applying the one or more electrodes comprises applying electrodes transmyocardially.

Claim 171 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein applying the one or more electrodes comprises applying electrodes transvenously.

Claim 172 (PREVIOUSLY PRESENTED): A method according to Claim 50, and comprising receiving an output signal responsive to activity of the heart, and wherein conveying the extended pacing signal comprises modifying the pacing signal responsive to the output signal.

Claim 173 (PREVIOUSLY PRESENTED): A method according to Claim 172, wherein receiving the output signal comprises receiving an electrophysiological signal.

Claim 174 (PREVIOUSLY PRESENTED): A method according to Claim 173, wherein the electrophysiological signal comprises a Monophasic Action Potential signal.

Claim 175 (PREVIOUSLY PRESENTED): A method according to Claim 173, wherein receiving the electrophysiological signal comprises placing a pair of bipolar electrodes in close mutual proximity in contact with the heart and receiving a bipolar signal from the bipolar electrodes.

Claim 176 (PREVIOUSLY PRESENTED): A method according to Claim 172, wherein modifying the pacing signal comprises detecting a possible arrhythmic stimulation of the heart and modifying the extended pacing signal so as to prevent the arrhythmic stimulation.

Claim 177 (PREVIOUSLY PRESENTED): A method according to Claim 50, wherein applying the one or more electrodes comprises applying electrodes such that conveying the extended pacing signal engenders a redistribution of cardiac muscle mass.

Claims 178-204 (CANCELLED)

Claim 205 (NEW): Apparatus for human heart pacing with hemodynamic improvement, comprising:

one or more electrodes, which are adapted to convey electrical signals to respective cardiac muscle segments; and

signal generation circuitry, which is adapted to apply an extended pacing signal to the one or more electrodes so as to pace the human heart, the extended pacing signal having an overall duration greater than 8 ms from a time of initiation of application of that portion of the signal that initiates action potential propagation,

wherein the extended pacing signal comprises a single extended pulse, and

wherein the signal has an amplitude that is not sufficient for cardioversion.

Claim 206 (NEW): A method for heart pacing with enhancement of cardiac contraction, comprising:

applying one or more electrodes to a human subject's heart; and

conveying an extended pacing signal to the one or more electrodes so as to pace the heart, the extended pacing signal having an overall duration greater than 8 ms from a time of initiation of application of that portion of the signal that initiates action potential propagation,

wherein conveying the extended pacing signal comprises conveying a single extended pulse, and

wherein the signal has an amplitude that is not sufficient for cardioversion.